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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,171	02/26/2004	Tsung-Ming Pai	JCLA10543	9923
23900	7590	09/06/2005	EXAMINER	
J C PATENTS, INC. 4 VENTURE, SUITE 250 IRVINE, CA 92618			HA, NATHAN W	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 09/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/789,171

Applicant(s)

PAI ET AL

Examiner

Nathan W. Ha

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 5, 6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5-6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 5 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Danvir et al. (US 2004/0169275, previously cited, hereinafter, Danvir.)

In regard to claim 5, in figs. 1a-1c, Danvir discloses a flip-chip packaging process, comprising at least the steps of:

providing a chip 110 (210 in figs. 2) and a substrate 150, wherein the chip has an active surface with bonding pads 114 disposed thereon, and the substrate has a carrying surface with bump pads 152 disposed thereon, wherein locations of the bump pads correspond to locations of the bonding pads, fig. 1c;

disposing a plurality of supporters 140 at a periphery of the active surface, and forming an uncured electrically conductive adhesive bump 122 on each bump pad;

situating the chip over the carrying surface of the substrate to connect the active surface and the carrying surface via the supporters with a distance between the active surface and the carrying surface, fig. 1c;

pressing the chip toward the substrate to decrease the distance between the active surface and the carrying surface, so as to **inherently** cause elastic strain in the supporters and increase a contact area between each pair of electrically conductive adhesive bump and bonding pad;

stopping pressing the chip, so that the conductive adhesive bumps have a smaller diameter at a central portion thereof than at the end portions horizontally, or eclipse shape, fig. 1c; and

curing the electrically conductive adhesive bumps. See also section [0060].

In regard to claim 10, wherein the electrically conductive bump 120 are formed on the pads by a screen printing method (section [0047]).

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 6 and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Danvir as applied to claims 5 and 10 above, and further in view of Nakazawa et al. (US 6,448,665, previously cited, hereinafter, Nakawawa.)

In regard to claim 6, Danvir discloses all of the claimed limitations as mentioned above, except the bumps are formed of gold. It should be noted that gold material is widely used in semiconductor packaging due to its high level of thermal and electrical

conductivity. For instance, Nakazawa, discloses an analogous package including a substrate 11, a chip 12 and conductive elements 16. The conductive elements, or bumps, are made of gold in order to achieve high level of conductivity between devices (col. 9, lines 35-39.)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use gold as taught by Nakazawa in Danvir's in order to achieve high level of conductivity between devices.

In regard to claims 8 and 9, Nakazawa further discloses that the adhesive filler contains conductive filler as silver (col. 10, lines 25-30.)

### ***Response to Arguments***

5. Applicant's arguments filed 7/6/05 have been fully considered but they are not persuasive. For instance, Applicants contend that the cited art '275 does not disclose the limitation such "pressing the chip toward the substrate to decrease the distance ...." And "stopping pressing the chi..." These limitations inherently can be found in the cited art's figures 1a-1c, where the process of forming the package together is shown. For example, the arrows indicate the chip being pressing downward to the substrate to a predetermined distance. The process is stopped when the chip disposed on top of the supporters on the sides, or peripheral of the chip. This causes the deformation of the uncured solder bumps from spherical shape to eclipse as shown in fig. 1c. Figure 1c further shows the bumps have different diameters, longer at the horizontal direction.

Applicants further submit that the above cited art '275 does not disclose the supporters disposed at the peripheral of the chip. In this case, the peripheral as claimed is described by the Applicants in fig. 2C, for example. It is described as a surrounding area outside of the bumps area. This peripheral, therefore, is found to be disclosed in the cited art fig. 1c, wherein the supporters 140 is formed outside the bumps area and in fact these supporters provide the same function as currently claimed.

Applicants further allege that the cited art '665 in the combination does not teach the material of the bumps such as gold. This teaching, as mentioned previously, can be found in '665's col. 9, lines 35-39.

The cancellation of claim 7 is acknowledged and has overcome the previous drawings objection. Accordingly, the objection has been withdrawn.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2814

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Nathan Ha  
August 30, 2005



HOAI PHAM  
PRIMARY EXAMINER